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tion to other historical debates surrounding the origin, diffusion, and use of the waterwheel, and even when he does not resolve them (primarily because of lack of historical data), he elucidates them. Over 150 figures and tables make this possible. The book, both in content and in its generous but appropriate use of iconographic evidence, carries forward the high standard set by earlier volumes in the series.—Robert W. Seidel, History, Texas Tech University

The Rise of Robert Millikan: Portrait of a Life in American Science. Robert H. Kargon. 205 pp. Cornell University Press, 1982. \$22.50.

The name of Robert Millikan (1868–1953) is familiar to anyone who has taken a physics course that discussed his famous oil drop experiment, which, together with his equally important work on the photoelectric effect, gained him the Nobel Prize for physics in 1923. Twentieth-century historians of science are familiar with the various and sometimes controversial roles that he played within the American physics community, as a scientist, academic administrator, advisor to governmental and funding agencies, and public spokesman for his conception of the role of science in the context of human experience.

Hitherto, Millikan's autobiography, published in 1950, was the only available book-length account of his life and achievements. To be sure, there have been numerous articles and commen-

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In his preface, Kargon states that he is not writing a biography of Millikan but rather a portrait of the man and the scientific scene in early 20th-century America. I consider that he has succeeded well in this endeavor. Kargon also states that he is writing not only for scientists and historians of science. I am not sure how many additional readers will be attracted by his detailed discussions of some of the physical questions to which Millikan devoted his attention, such as the cosmic-ray controversy. However, the book is well written, and readers who are already reasonably conversant with 20th-century developments in physics will find much that is illuminating.

Historians of science and scientists interested in the history of their discipline will welcome the new material Kargon has gleaned from sources such as the archives of the California Institute of Technology, including a series of 20 photographs which greatly enhance the book's appeal. At the end, Kargon carefully documents his general sources and the bases for specific statements made within the individual chapters, thus making the book a genuine contribution to the history of science.—Katherine R. Sopka, Durango, CO

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Physical Sciences

- Abrahams, K., K. Allaart, A. E. L. Dieperink, eds. **Symmetries in Nuclear Structure**. NATO ASI, B93. 301 pp. Plenum. \$47.50.
- Adamson, I. T. **Introduction to Field Theory**, 2nd ed. 181 pp. Cambridge, 1982. \$19.95 c. \$9.95 p.
- Akhmetov, N., M. Azizova, L. Badygina. **Problems and Laboratory Experiments in Inorganic Chemistry**. Trans. A. Roskin. 256 pp. Chicago: Imported Pubs., 1982. \$8.95.
- Akitt, J. W. **NMR and Chemistry: An Introduction to the Fourier Transform-Multinuclear Era**, 2nd ed. 263 pp. Methuen. \$39.95 c. \$16.95 p.
- Aklonis, J. J., & W. J. MacKnight. **Introduction to Polymer Viscoelasticity**, 2nd ed. 295 pp. Wiley-Interscience. \$39.95.
- Barton, J. P., & P. Von Der Hardt, eds. **Neutron Radiography**. Proc., San Diego, 1981. Commission of the European Communities. 1973 pp. D. Reidel. \$126.
- Barut, A. O., ed. **Quantum Theory, Groups, Fields and Particles**. Math. Phys. Stud. 334 pp. Reidel. \$45.50.
- Behrens, H., & W. Bühring. **Electron Radial Wave Functions and Nuclear Beta-Decay**. 626 pp. Oxford. \$98.
- Bell, D. L., ed. **The Big Bang and Element Creation**. 148 pp. London: The Royal Society. Npg.
- Berkowitz, K., & K.-O. Groeneweld, eds. **Molecular Ions: Geometric and Electronic Structures**. NATO ASI, B90. 594 pp. Plenum. \$79.50.
- Boyd, R. W. **Radiometry and the Detection of Optical Radiation**. 256 pp. Wiley. \$34.95.
- Bransden, B. H., & C. J. Joachain. **Physics of Atoms and Molecules**. 686 pp. Longman. P. n.p.
- Brown, G. H., ed. **Advances in Liquid Crystals**, V. 5. 240 pp. Academic. 1982. \$42.
- Button, K. J., ed. **Infrared and Millimeter Waves**, V. 7. **Coherent Sources and Applications**, Pt 2. 591 pp. Academic. \$13.
- Capri, A. Z., & A. N. Kamal, eds. **Particles and Fields**. 2. 706 pp. Plenum. \$97.50.
- Cartwright, N. **How the Laws of Physics Lie**. 221 pp. Oxford. \$9.95.
- Chakrabarti, C. L., & R. E. Sturgeon, eds. **Progress in Analytical Atomic Spectroscopy**, V. 5. 478 pp. Pergamon. 1982. \$114.
- Chandrasekhar, S. **The Mathematical Theory of Black Holes**. Int. Ser. Mono. Phys. 646 pp. Oxford. \$110.
- Clayton, G. B. **Operational Amplifier Experimental Manual**. 130 pp. Butterworths. \$34.95.
- Demas, J. N. **Excited State Lifetime Measurements**. 273 pp. Academic. \$45.
- Di Bartolo, B., & J. Danko, eds. **Collective Excitations in Solids**. NATO ASI R 88. 716 pp. Plenum. \$95.
- Ellis, J., & S. Ferrara, eds. **Unification of the Fundamental Particle Interactions**. 2. Ettore Majorana. Phys. Sci. 15. 527 pp. Plenum. \$69.50.
- Erdős, P., & J. M. Robinson. **The Physics of Actinide Compounds**. Physics of Solids and Liquids. 213 pp. Plenum. \$39.50.
- Flett, D. S., ed. **Ion Exchange Membranes**. 210 pp. Wiley. Npg.
- Flower, D. R., ed. **Planetary Nebulae**. IAU, 103. 557 pp. Reidel. \$65c. \$30 p.
- Ghosh, P. K. **Introduction to Photoelectron Spectroscopy**. 377 pp. Wiley-Interscience. \$55.
- Grey, J. **Beachheads in Space: A Blueprint for the Future**. 274 pp. Macmillan. \$14.95.
- Guth, A. H., K. Huang, R. L. Jaffe, eds. **Asymptotic Realms of Physics: Essays in Honor of Francis E. Low**. 262 pp. MIT. \$35.
- Harada, N., & K. Nakanishi. **Circular Dichroic Spectroscopy: Exciton Coupling in Organic Stereochemistry**. 460 pp. Mill Valley, CA: University Science Books. \$32.
- Hinze, J., ed. **Energy Storage and Redistribution in Molecules**. 615 pp. Plenum. \$85.
- Honerkamp, J., K. Pohlmeier, H. Römer, eds. **Structural Elements in Particle Physics and Statistical Mechanics**. NATO ASI, B82. Plenum. \$65.
- Horváth, C., ed. **High-Performance Liquid Chromatography: Advances and Perspectives**, V. 3. 230 pp. Academic. \$36.
- Hung-Chia, H., & A. W. Snyder, eds. **Optical Waveguide Sciences**. Proc. Kweilin, People's Republic of China, 1983. 360 pp. Nijhoff. \$49.50.
- Ishlinsky, A. Y., ed. **Advances in Theoretical and Applied Mechanics**. 164 pp. Chicago: Imported Publications, 1981. \$59.95 p.
- Islam, J. N. **The Ultimate Fate of the Universe**. 155 pp. Cambridge. \$13.95.
- Kadomtsev, B. B., ed. **Plasma Physics**. Trans. O. Glebov. 191 pp. Chicago: Imported Publications, 1981. \$6.45 p.
- Katritzky, A. R., ed. **Advances in Heterocyclic Chemistry**, V. 33. 336 pp. Academic. \$65.
- Kippenhahn, R. **100 Billion Suns: The Birth, Life, and Death of the Stars**. 264 pp. Basic. \$25.
- Kürsunoglu, B., & A. Perlmuter, eds. **Field Theory in Elementary Particles**. Stud. Nat. Sci., 19. 469 pp. Plenum. \$65.
- Lees, R., & A. F. Smith, eds. **Chemical Nomenclature Usage**. 172 pp. Halsted Press. \$49.95.
- Lifshitz, I. M., ed. **Quantum Theory of Solids**. 320 pp. Chicago: Imported Publications, 1982. \$8.95 p.
- Lippard, S. J., ed. **Progress in Inorganic Chemistry: An Appreciation of Henry Taube**, V. 30. 528 pp. Wiley-Interscience. \$65.
- Livio, M., & G. Shaviv, eds. **Cataclysmic Variables and Related Objects**. IAU, 72. 351 pp. Reidel. \$48.
- McLachlan, D., Jr., & J. P. Glusker, eds. **Crystallography in North America**. 479 pp. Am. Crystallographic Assoc. \$50.
- McQuarrie, D. A. **Quantum Chemistry**. 517 pp. Mill Valley, CA: University Science. \$25.
- Morrison, P., P. Morrison. **Powers of Ten: A Book about the Relative Size of Things in the Universe and the Effect of Adding Another Zero**. 164 pp. W. H. Freeman. \$29.95.
- Nentwig, J., M. Kreuder, K. Morgenstern. **Chemistry Made Easy: A Programmed Course for Self-Instruction**, Pt 1. Trans. D. H. Rouvray. 652 pp. Pt 2, Trans. E. Wentrup-Byrne. 691 pp. Deerfield Beach, FL: Verlag Chemie. P. n.p.
- Novikov, J. D. **Evolution of the Universe**. Trans. M. M. Basko. 176 pp. Cambridge. \$14.95.
- Perram, J. W., ed. **The Physics of Superionic Conductors and Electrode Materials**. NATO ASI, B92. 281 pp. Plenum. \$45.
- Reutov, O. A., I. P. Beletskaya, A. L. Kurts. **Ambient Anions**. Trans. J. P. Michael. 338 pp. New York: Consultants Bureau. Npg.
- Richards, W. G., & D. L. Cooper. **Ab initio Molecular Orbital Calculations for Chemists**, 2nd ed. 116 pp. Oxford. \$16.95 p.
- Satchler, G. R. **Direct Nuclear Reactions**. 833 pp. Oxford. \$110.
- Septier, A., ed. **Applied Charged Particle Optics**, Pt. C: **Very-High-Density Beams**. Adv. Electronics & Electron Physics. 545 pp. Academic. \$74.50.
- Shakhshiri, B. Z. **Chemical Demonstrations: A Handbook for Teachers of Chemistry**, V. 1. 343 pp. Wisconsin. \$25.
- Shapiro, S. L., & S. A. Teukolsky. **Black Holes, White Dwarfs, and Neutron Stars: The Physics of Compact Objects**. 645 pp. Wiley-Interscience. \$39.95 c. \$24.95 p.
- Shirokov, Y. M., & N. P. Yudin. **Nuclear Physics**, V. 1 & 2. Trans. M. Samokhvalov. 445 pp. Chicago: Imported Pubs., 1982. \$16.95 set.
- Stanley-Wood, N. G., ed. **Enlargement and Compaction of Particulate Solids**. 249 pp. Butterworths. \$59.95.
- Twigg, M. V., ed. **Mechanisms of Inorganic and Organometallic Reactions**. 373 pp. Plenum. \$49.50.
- Torretti, R. **Relativity and Geometry**. 395 pp. Pergamon. \$45.
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- Walton, A. J. **Three Phases of Matter**, 2nd ed. 482 pp. Oxford. \$24.95 p.
- Weil, R., ed. **Percolation Structures and Processes**. Ann. Israel Physical Soc., 5. 504 pp. Amer. Inst. Phys. \$60.
- Weltner, W., Jr. **Magnetic Atoms and Molecules**. 422 pp. Van Nostrand Reinhold. \$39.50.
- West, R. M., ed. **Highlights of Astronomy: As Presented at the 18th General Assembly of the International Astronomical Union**, 1982, V. 6. 817 pp. Reidel. \$93.50 c. \$43.50 p.
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- Williams, M. M. R., & N. J. McCormick, eds. **Progress in Nuclear Energy**, V. 10. 408 pp. Pergamon. \$120.
- Yang, C. N. **Selected Papers, 1945-1980: With Commentary**. 596 pp. W. H. Freeman. \$39.95 c. \$13.95 p.
- Yavorsky, B. M., & A. A. Detlef. **A Modern Handbook of Physics**. Trans. N. Weinstein. 712 pp. Chicago: Imported, 1982. \$13.95.
- Anderson, W. I. **Geology of Iowa: Over Two Billion Years of Change**. 268 pp. Iowa State. \$32.50 c. \$17.95 p.
- Armstead, H. C. H. **Geothermal Energy: Its Past, Present and Future Contributions to the Energy Needs of Man**, 2nd ed. 404 pp. Methuen. \$49.95.
- Baars, D. L. **The Colorado Plateau: A Geologic History**. 279 pp. New Mexico. \$27.95 c. \$13.95 p.
- Beer, T. **Environmental Oceanography: An Introduction to the Behavior of Coastal Waters**. 262 pp. Pergamon. \$30 c. \$13 p.
- Berry, L. G., & B. Mason. **Mineralogy: Concepts, Descriptions, Determinations**, 2nd ed. 561 pp. W. H. Freeman. \$29.95.
- Clayton, C. G., ed. **Nuclear Geophysics: Selected Papers on Applications of Nuclear Techniques in Mineral Exploration, Mining and Process Control**. 479 pp. Pergamon. \$60.
- Collinson, D. W. **Methods in Rock Magnetism and Palaeomagnetism: Techniques and Instrumentation**. 503 pp. Methuen. \$79.95.
- Cubitt, J. M., & R. A. Reymont, eds. **Quantitative Stratigraphic Correlation**. 301 pp. Wiley. \$54.95.
- Fox, W. T. **At the Sea's Edge: An Introduction to Coastal Oceanography for the Amateur Naturalist**. 317 pp. Spectrum. \$21.95 c. \$12.95 p.
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- Grathwohl, M. **World Energy Supply Resources, Technologies, Perspectives**. 450 pp. Walter de Gruyter. 1982. \$54.50.
- Kennett, J. P., & M. S. Srinivasan. **Neogene Planktonic Foraminifera: A Phylogenetic Atlas**. 263 pp. Hutchinson Ross. \$36.50.
- Lehmann, U., & G. Hillmer. **Fossil Invertebrates**. Trans. J. Lettau. 350 pp. Cambridge. Npg.
- McCall, G. J. H., ed. **Ophiolitic and Related Melanges**. Benchmark Papers in Geology, 66. 446 pp. Hutchinson Ross. \$56.
- Mangone, G. J., ed. **The Future of Gas and Oil From the Sea**. 216 pp. Van Nostrand Reinhold. \$35.
- Maynard, J. B. **Geochemistry of Sedimentary Ore Deposits**. 305 pp. Springer-Verlag. \$29.80.
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